STRUCTURE FOR ADJUSTING LENGTH OF ORNAMENT CHAINS

Background of the Invention

Cross Reference To Related Applications

This application is a continuation-in-part of U.S. Serial No. 09/418,794, filed on October 15, 1999, which is hereby incorporated by reference in its entirety.

Field of the Invention

The present invention relates to an improvement in a structure for adjusting the length of an ornament chain, in which the length of an ornament chain or a loop tie is adjusted with the use of an adjuster.

Description of Related Art

Conventionally, there has been known a structure of a retainer for an ornament chain, as an adjuster of this kind, as disclosed in Japanese Utility Model Registration No. 3,042,071, which is characterized in that the ornament chain is inserted and retained in the retainer, and the retainer has a spherical shape or the like, and has a through-hole in which the

ornament chain is inserted, the retainer including therein a resilient member for preventing the ornament chain from coming off.

This resilient member is formed in an arcuate leaf spring by bending opposite ends of a single leaf spring on the same side so as to have a semicylindrical shape so that the opposite ends have a back-to-back relationship, and a pair of left and right ornament chains are inserted and clamped between the back-to-back parts of the arcuate leaf spring.

Accordingly, there has been provided such an arrangement that the area of contact between the ornament chains and the above-mentioned resilient member is narrow, and accordingly, the clamping force acts only upon a local part, thereby it is required to increase the clamping force, causing the ornament chains to be easily and locally damaged.

Summary of the Invention

The invention is devised in view of the above-mentioned circumstances, and accordingly, a main object of the present invention is to provide a structure for adjusting the length of an ornament chain, which can increase a clamping force without the ornament chain being damaged, by widening the clamping surface with respect to the ornament chain.

Another object of the present invention is to provide a structure for similarly adjusting the lengths of even a pair of ornament chains.

Brief Description of the Drawings:

Figs. 1(a)-1(b) represents the sequential steps in forming the cylindrical resilient member;

Figs. 1(c)-1(e) represent the sequential steps in forming the casing;

Fig. 2 is a sectional view illustrating a retainer;

Fig. 3 is a front view illustrating an example of a structure for adjusting the length of the ornament chain using the retainer;

Fig. 4 is a sectional view illustrating a retainer incorporating two resilient members in the casing;

Fig. 5 is a sectional view illustrating an arrangement such that the retainer is used being opposed to the ornament chain;

Fig. 6 is a sectional view illustrating a retainer in which a casing is engageably separated;

Fig. 7 is a perspective view illustrating a resilient member having a raised part in another embodiment;

Fig. 8 is a perspective view illustrating a resilient member in the other embodiment in which the shape of a cutout is different;

Fig. 9 is a perspective view illustrating a resilient member in further of the other embodiment in which the shape of a cutout is different;

Fig. 10 is a cross-sectional view of the retainer of another embodiment;

Fig. 11(a) is a cross-sectional view of the retainer including a resilient member in the casing such that both ends of the resilient tube are in contact with the inner wall of the casing;

Fig. 11(b) is a cross-sectional view of the retainer including the resilient member in the casing such that the both ends of the resilient tube are not in contact with the inner wall of the casing;

Fig. 12 is a cross-sectional view of another embodiment of the resilient tube having a bump;

Fig. 13 is a cross-sectional view of another embodiment of the resilient tube having

a tapered portion; and

Fig. 14 is a cross-sectional view of another embodiment of the retainer having a spherical casing.

Description of Preferred Embodiment of the Invention

Referring to Figs. 1 to 3, the structure for adjusting the length of an ornament chain has a single retainer 10 adapted to be fixed to an ornament. This retainer 10 is composed of a casing 1 and a cylindrical resilient member 4 incorporated in the casing 1. Although the casing 1 has a substantially cylindrical shape as shown in the figures, the casing 1 should not be limited to this shape, but it may have any shape such as a shape having a polygonal outer surface, egg shape, or any other shape an ornament chain can be inserted into.

The ornament chain 2 constitutes a necklace or a bracelet, and is a ball chain or a bead chain or any of other well-known chains.

In order to insert this ornament chain 2 in the retainer 10, through-holes are formed in the casing 1.

That is, the casing 1 has a hole 3a on the side where the ornament chain 2 is inserted, and a hole 3b on the side where the ornament chain passing through the casing 1 is led out.

As shown in Fig. 1c, the casing 1 is formed from a metal pipe which is cut into a predetermined length and opposite ends of which are rounded for chamfering, as shown in Fig. 1d.

Thus formed cylindrical body is inserted therein with a resilient member 4 which will be detailed later, and as shown in Fig. 1(e), the chamfered opposite ends as mentioned above,

are then caulked or squeezed so as to form small diameter holes 3a, 3b.

These holes 3a, 3b have a diameter which is set to be slightly larger than that of the outer periphery of the ornament chain so that the ornament chain can smoothly slide therein.

Next, the resilient member 4 is a cylindrical spring formed in such a way that a single metal leaf spring shown in Fig. la is cylindrically curved as shown in Fig. lb, and a slit-like cutout 5 which is linearly extended is defined in the center joint part.

The resilient member 4 has a diameter which is smaller than that of the outer periphery of the ornament chain 2 so that an urging force is effected in a direction in which the outer periphery of the ornament chain 2 is fastened when the ornament chain 2 is inserted in this resilient member 4.

Openings at opposite ends of the resilient member 4 define a hole 4a on the side where the ornament chain 2 is inserted, and a hole 4b on the side where the ornament chain 2 passing through the resilient member comes out.

Further, since the resilient member is a cylindrical shape by rounding a metal material, it is possible to prevent the resilient function from being lost due to heat.

Thus, other components and members such as another casing and an ornament member can be joined thereto by heating (for example, brazing).

Accordingly, when the ornament chain 2 is inserted into the resilient member 4, the resilient member 4 is pushed out in its enlarging direction by the outer peripheral surface of the ornament chain 2 so that the resilient member 4 itself is urged in a decreasing direction.

Thus, the ornament chain 2 inserted in the resilient member 4 is always fastened by the resilient member 4 due to fastening by the urging force of the resilient member 4.

It is noted that the resilient member 4 is accommodated in the hollow part of the

retainer 1, and accordingly, the diameters of the insertion hole and the come-out hole of the retainer are set to be small so that the resilient member 4 is prevented from coming off.

Accordingly, as shown in Fig. 2, when the ornament chain 2 is pulled in either direction, only the ornament chain 2 is associatingly pulled out so that one end part of the resilient member 4 abuts against the inner wall of the retainer 1 so as to restrain the motion thereof.

If the ornament chain is strongly pulled, only the ornament chain is pulled out while enlarging the resilient member 4, overcoming the urging force of the resilient member 4.

Thus, the ornament chain can be led out from the retainer so as to adjust the length thereof.

If the ornament chain is pulled in the reverse direction, the resilient member 4 is moved in the reverse direction within the retainer, and abuts against the inner wall of the hole on the opposite side, and accordingly, the ornament chain can be pulled out in the reverse direction while the resilient member is enlarged, similar to that mentioned above.

In the above-mentioned embodiment, although it has been explained of such an arrangement that one end part of the single ornament chain is locked to a retaining ring 20 through the intermediary of a fixture 21 so as to have such an arrangement that the other end part is inserted in the retainer in order to adjust the length of the ornament chain, a retainer 10 which can adjust the lengths of a plurality of ornament chains is shown in Fig. 4.

This retainer 10 enables a plurality of ornament chains (two ornament chains in the embodiment shown in this figure) to be fitted in the casing 1 in parallel with each other, and resilient members 4 are fitted onto the ornament chains 2, respectively, within the casing 1. In this embodiment shown in this figure, like reference numerals are used to denote like parts, but

followed by "'" in order to distinguish the parts from one another, for the sake of brevity in explanation.

That is, a pair of holes 3a, 3a' and a pair of holes 3b, 3b' are formed in opposite ends of the casing 1, being opposed to one another.

Further, resilient members 4, 4' are arranged between the holes 3a, 3b, and between the holes 3a and 3a', respectively, and are fitted, respectively, on two ornament chains 2, 2' which respectively extend through the above-mentioned holes 3a, 3a' and 3b, 3b', in parallel with each other.

These ornament chains 2, 2' may be used by winding a single ornament chain or by using a plurality of ornament chains in parallel with each other.

In this case, the lengths of the ornament chains 2, 2' can be respectively adjusted by pulling the respective ornament chains 2, 2' themselves.

Next, Fig. 5 shows a retainer in which the lengths of a plurality of ornament chains (four ornament chains) can be adjusted.

In this case, similar to the above-mentioned embodiment, four holes 3a, 3b are formed as insertion holes and come-out holes, respectively, and four resilient members 4 are correspondingly provided. The other structure is similar to that of the above-mentioned embodiment, and accordingly, explanation thereto will be omitted.

A retainer 10 shown in Fig. 6 is composed of a plurality of casings 1A, 1B which are disengageably coupled together, and resilient members 4 are incorporated in the casings 1A, 1B so that the ornament chains 2, 2' which are fitted in the casings 1A, 1B can slide therein so as to adjust their lengths.

The casings 1A, 1B are provided therein with constituting parts 9, 9'of engaging

means, locking structures or other removable coupling means, respectively, and accordingly, they can be disengageably coupled integrally with each other.

The constituting parts 9, 9' shown in Fig. 6 is composed of a pair of magnets. For example, a structure composed of a hook and a receiving part for receiving the former, a structure for concave and convex engagement, and various kind of structures can be used.

This retainer 10 may be used for a loop type necklace or the like.

In this case, the casings 1A, 1B are separated from each other so as to remove the necklace, and with coupling the casings 1A, 1B together or without coupling them, the length of the ornament chain 2 can be adjusted by pulling the ornament chain 2.

A resilient member 4 shown in Fig. 7 is formed with a raised part 7 on its peripheral wall, which is projected inward.

In this case as shown, this raised part 7 is formed in a substantially annular shape along the outer periphery, but it may be the one which is discretely projected, instead of the one which is continuously projected along the outer periphery as mentioned above.

With this arrangement, even if the ornament chain is, for example, a bead-like chain only composed of a ring-like chain which does not include spherical pieces or cubic pieces having a large contact area with respect to the resilient member, the raised part 7 abuts against the chain so as to surely effect an urging force.

A resilient member 4' shown in Fig. 8 has a slit-like cutout 5' which is extended longitudinally while it is inclined with respect the axial direction of the resilient member 4', and accordingly, pieces of the ornament chain can hardly be caught in the cut-out even though the pieces have angle corners.

Further, a resilient member 4' shown in Fig. 9 has a slit-like cutout 5' which is

axially extended, being wavelike curved.

With this arrangement, even if the pieces of the ornament chains 2' have angle corners, instead of rounded corners, linearly extended ridge lines of the side surfaces thereof, can hardly be caught in the cutout 5'.

According to the present invention, the shape of the cutout may be suitably changed in view of a shape of the ornament chains, that is, it may select any of various shapes, that is, the one obliquely inclined or meandering.

Further, one end part of the resilient member may be proxided with a flange or may have a large thickness so as to prevent the resilient member from coming off even though a hole in the casing is enlarged.

As mentioned above, with the structure for adjusting the length of an ornament chain, according to the present invention, the resilient member is fitted on the ornament chain so as to be restrained, and accordingly, the clamping area of the resilient member for the ornament chain can be widened, thereby it is possible to enhance the camping force and as well to restrain the ornament chain from being damaged.

In a retainer 10 as shown in Fig. 10, a resilient tube 4' is used as a different embodiment of the resilient member.

The resilient tube 4' comprises cylindrical synthetic rubber. As shown in Fig. 11(a), an exterior diameter L2 of the resilient tube 4' is longer than a diameter Ll of a hole 3a (3b) of a casing 1 (L2>Ll), and a diameter L3 of a through hole 4a is shorter than the diameter Ll of the hole 3a (3b) of the casing 1.

Further, a diameter L4 in a maximum perimeter portion of an ornament chain 2 is slightly shorter than the diameter Ll of the hole 3a (3b), and the diameter L3 of the through hole

4a is shorter than the diameter L4.

That is, L2>L1>L4>L3 holds.

Accordingly, when the ornament chain 2 is inserted through the resilient tube 4', a biasing force acts in a direction to fasten the periphery of the ornament chain 2.

Note that as the ornament chain 2, Fig. 10 shows a ball chain, however, Fig. 11(b) shows a compact chain.

The length of the resilient tube 4' is set such that the both ends in the lengthwise direction are not strongly pressed in contact with the inner wall of the hollow portion 1a of the casing 1, but the ends are in contact with the inner wall (See Fig. 11(a)) or not in contact with the inner wall (See Fig. 11(b)).

The length of the tube is set as above since when the resilient tube 4' in contracted status is accommodated in the casing 1, even at no load, the both ends of the resilient tube 4' are in tight contact with the inner wall near the hole of the casing 1 and the resilient tube 4' cannot be easily rotate.

Further, the diameter L2 of the resilient tube 41 is shorter than a diameter L5 of the hollow portion (in case of oval shape, the minimum diameter) of the casing 1.

Accordingly, the resilient tube 4' is placed in the casing 1 such that a gap S formed between the tube and the inner wall of the hollow portion 1a of the casing 1 along the outer peripheral wall of the tube.

Further, it may be arranged such that the resilient tube 4' is contracted and pressed int the hollow portion 1a of the casing 1 from one of the holes 3a and 3b.

Otherwise, it may be arranged such that in the manufacturing process of the casing 1, at a stage where the entrance hole is slightly reduced (See Fig. 1(d) in the previous

embodiment, the resilient tube 4' is inserted, then the diameter of the entrance hole is narrowed as the pipe 13 (See Fig. 1(e)) so as to prevent the resilient tube 4' from dropping.

In the above construction, when the ornament chain 2 is inserted through the resilient tube 4', the resilient tube 4' is forcibly-expanded in an expanding direction by the outer periphery of the ornament chain 2, and in the resilient tube 4' itself, a biasing force acts in a contracting direction.

The ornament chain 2 inserted through the resilient tube 4', fastened by the biasing force of the resilient tube 4', is always press-held by the resilient tube 4'.

The resilient tube 4' is interlocked with the movement of the ornament chain 2 in the hollow portion 1a of the casing 1 in the retainer 10.

Accordingly, as shown in Fig. 10, when the ornament chain 2 or the casing 1 of the retainer 10 is pulled in any direction, the resilient tube 4' is also pulled, and the end of the resilient tube 4' comes into collision against the inner wall around the hole 3a or 3b of the casing 1, thus the movement of the resilient tube 4' is restrained.

Further, in this status, when the casing 1 of the retainer 10 is strongly pulled, the end of the resilient tube 4' in contact with the inner wall is compressed, and the ornament chain 2 is pulled out while expanding the through hole 4a of the resilient tube 4' against the biasing force of the resilient tube 4' holding the chain.

Thus the position of the retainer 10 with respect to the ornament chain 2 can be changed by sliding the retainer 10 along the ornament chain 2.

Further, since the resilient tube 4' is formed such that there is a gap in a ring shape between the periphery of the resilient tube 4' and the inner wall of the hollow portion 1a in the hollow portion 1a of the casing 1, when the resilient tube 4' is under no load, the resilient tube 41

can be easily rotated on its axis in the hollow portion of the casing 1.

At this time, even if the both ends or one end in the lengthwise direction of the resilient tube 4' is in contact with the inner wall of the casing 1, no braking force to prevent the above rotation occurs.

Accordingly, if the ornament chain is twisted, the resilient tube 4' can be easily rotated in the casing 1 in accordance with the movement of the chain in the twist direction.

In the above embodiment, a gap is continuously formed in a ring shape along the periphery of the resilient tube 4', however, it may be arranged such that a part of the tube is in contact with the inner wall of the hollow portion.

In such case, as the rotation cannot be easily made if the resilient tube 4' is in tight contact with the inner wall, it is desirable that the part of the tube is merely in contact with the inner wall.

Further, regarding the both ends in the lengthwise direction of the resilient tube 4', when the chain 2 is slid, at least the end of the pulled side is pressed into contact with the wall near the hole 3a (3b) of the casing 1. When such load has disappeared, the end returns inside the hollow portion. In case of arrangement where the tube is not in contact with the inner wall of the hollow portion la of the casing 1, the tube does not disturb the rotation of the chain 2, and even in case of arrangement where the tube is in contact with the inner wall, the braking force is small, and the rotation of the chain can be comparatively easily made.

In this manner, as a gap S is formed continuously or intermittently along the periphery of the resilient tube 4', the chain press-held by the resilient tube 4' can be rotated on the axial line or distorted in the gap S. Thus the ornament chain 2 can be smoothly twisted when the ornament is wore.

The retainer 10 as shown in Fig. 12 has the casing 1 which is a hollow spherical

body. In this case, the resilient tube 4 is attached in a similar manner to that in the above embodiment.

Fig. 13 shows a different embodiment of the resilient tube 4' where inwardly swollen bump 7 is integrated with the peripheral wall.

The bump 7 is formed approximately in a ring shape along the periphery, however, intermittently swollen bumps may be employed in place of this bump continuously swollen along the periphery.

By this arrangement, even if the ornament chain 2 comprises the combination of rings, e.g. elliptic rings, without including solid pieces such as spherical members having a large area of contact with the resilient tube 4', the bump 7 comes into collision against the chain to ensure the operation of the biasing force.

Further, as shown in Fig. 14, it may be arranged such that in the through hole 4a of the resilient tube 4', ends 41 have approximately the same diameter of the outer perimeter of the chain, a tapered intermediate portion 42 has a gradually-decreasing diameter, and a central portion 43 has a small diameter for the operation of the biasing force by resilience. Thus the chain can be easily inserted through the tube.